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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/046,118	03/20/1998	CHARLES E. BOICE	EN998027	1827

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EXAMINER	
WONG, ALLEN C	
ART UNIT	PAPER NUMBER
2613	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/046,118	Applicant(s) BOICE ET AL.	
	Examiner Allen Wong	Art Unit 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 September 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 2, 7, 8, 10-28 and 31-41* is/are rejected.

7)☒ Claim(s) *3-6,9,29 and 30* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/4/03 has been entered.

Response to Arguments

2. Applicant's arguments filed 9/4/03 have been fully read and considered but they are not persuasive.

Regarding 2nd paragraph on page 18 of applicant's arguments, applicant asserts that neither the references of Reininger, Astle nor Pearlstein, taken separately or as a whole, teach the notion of artifact reduction when non-intra encoding frames with constant content from frame to frame. The examiner respectfully disagrees. As stated in previous Office Actions, paper no. 30, on column 6, lines 25-47, Astle clearly teaches the minimization of "pulsation artifacts". Astle's col.6, lines 35-38 discloses that a block from the reference picture that matches with the current block (from current picture) will not line up along the boundaries into which the pictures are tiled, encoded and decoded. In other words, there are temporal artifacts caused by difference in compression ratios between two sequential pictures (ie. reference block versus current block). After decoding the series of encoded still images, Astle teaches that "selective filtering" can

eradicate these artifacts in potentially artifactual areas without loss of important video data content (col.6, lines 51-60). Evidently, these block-edge artifacts are equivalent to the applicant's definition of pulsation artifacts because both are temporal artifacts caused by difference in compression ratios between two sequential pictures. And as far as the non-intra frame encoding frames, the Reininger reference does disclose the use of interframe encoding (col.2, ln.36-47; Reininger discloses the use of interframe processes for encoding still frames where a GOP can have various types of frames like B-pictures and P-pictures that clearly use interframe or *non-intra* coding processes to determine specific quantization parameter values for that specific still frame).
Regarding lines 14-16 on page 18 of applicant's remarks, applicant contends that Reininger does not teach the "minimize after decoding thereof, visually perceptive pulsation artifacts between still frames of a sequence of still frames". Please peruse the rejections and remarks from previous Office Actions: paper no. 30 dated on July 1, 2003, paper no. 22, dated on August 23, 2002, paper no. 20, dated on March 19, 2002, paper no. 16, dated on November 2, 2001, paper no. 13, dated on April 16, 2001, and paper no.8, dated on November 7, 2000.

Regarding the 1st paragraph on page 19 of applicant's remarks, applicant asserts that neither Reininger, Astle nor Pearlstein teach or suggest the disabling of motion estimation and limiting motion compensation. The examiner respectfully disagrees. In col.8, lines 41-58, Pearlstein discloses that the use of a refresh control processor which uses a refresh descriptor data for inhibiting frame display until a proper amount of non-erroneous image data develops for decoding. Moreover, Pearlstein discloses that until

an appropriate amount of non-erroneous image data is constructed, the image data is refreshed meaning that previous image data is repetitiously sent until the complete reference frame is constructed (col.9, lines 6-19). Thus, ceasing motion estimation and limiting motion compensation until non-erroneous image data is constructed so as to display clear, high quality image data. Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Reininger, Astle and Pearlstein, as a whole, for stopping motion estimation and limiting motion compensation so as to enable high quality display of image data at the decoding end and to encode with precision and high efficiency. Doing so would meet with today's highly complex video encoding standards.

Regarding lines 20-21 on page 19 of applicant's remarks, applicant asserts that Pearlstein is not relevant because Pearlstein is directed to decoding processes not encoding processes. The examiner respectfully disagrees. Clearly, it is the applicant that is misconstruing the teachings of Pearlstein. When one peruses figure 2 and 4, Pearlstein teaches the sue of an encoding unit where there is a transport encoder and a transport decoder. Clearly, Peaerlstein is very pertinent to the discussion of this case. Also, anyone of ordinary skill in the art would obviously know and recognize that if one has a set of encoding processes, then there must be a set of decoding processes that perform the opposite of the encoding processes and vice versa because both the encoding processes and the decoding process must coexist for proper functionality in any encoding/decoding system. It is clearly elucidated that Pearlstein pertains to

encoding processes, as claimed by applicant. Also, Pearlstein discloses a modulator 24 for the encoding process, as disclosed in fig.4.

Also, regarding 3rd paragraph on page 19 of applicant's remarks, applicant argues that since Pearlstein discloses the intra-coded portions of pictures, there is no motion estimation and motion compensation. The examiner respectfully disagrees. If one peruses Pearlstein's fig.4, one can see that there is interframe coding when it is formatted by element 14. And anyone of ordinary skilled in the art can easily acknowledge and recognize that since Pearlstein teaches that there is interframe coding, Pearlstein teaches motion estimation and motion compensation. And as far as the discussion of intra-coded pictures in Pearlstein, the disclose of intra-coded pictures is just one of several types of pictures that can be generated in Pearlstein's invention. As discussed before, Pearlstein's invention pertains to MPEG (see col.1 and 2) which clearly involves interframe coding and the generation of P (predictive) and B (bi-directional) frames.

To summarize, Pearlstein is relevant to the rejection of the applicant's claimed invention, as evidenced in the above remarks and in the rejection below.

Regarding pages 20-24 of applicant's remarks, applicant states that Reininger et al. does not teach the "still frame". The examiner respectfully disagrees. Again, please peruse the rejections and remarks from previous Office Actions: paper no. 30 dated on July 1, 2003, paper no. 22, dated on August 23, 2002, paper no. 20, dated on March 19, 2002, paper no. 16, dated on November 2, 2001, paper no. 13, dated on April 16, 2001, and paper no.8, dated on November 7, 2000.

In regards to the discussion of the present invention, the relevance of Reininger is clear because applicant's figure 1 is similar to Reininger's Figure 2 where both figures have similar elements like DCT, quantization, motion estimation, variable length coders, inverse quantization, etc. Applicant states that Reininger fails to teach or suggest the adjusting the encode process of the frame as soon as the frame is identified to comprise a still frame. The examiner respectfully disagrees. In fig.2, element 27, Reininger teaches the processor modifies at least the quantization, element 14. In other words, Reininger teaches the adjusting the encode process of the frame as soon as the frame is identified to comprise a still frame. Reininger already discloses the "process for adaptive encoding of a frame when the frame is a "still frame".

Regarding pages 24-25 of applicant's remarks, applicant argues that Reininger does not disclose the minimizing visually perceptible pulsation artifacts occurring in a sequence of still frames which are displayed after undergoing encoding and decoding of the identical frames. Please peruse the rejections and remarks from previous Office Actions: paper no. 30 dated on July 1, 2003, paper no. 22, dated on August 23, 2002, paper no. 20, dated on March 19, 2002, paper no. 16, dated on November 2, 2001, paper no. 13, dated on April 16, 2001, and paper no.8, dated on November 7, 2000.

As previously stated, applicant contends that Astle does not teach the pulsation artifacts, and that the examiner misuses the term "pulsation artifacts". The examiner respectfully disagrees. On column 6, lines 25-47, Astle clearly teaches the minimization of "pulsation artifacts". Astle's col.6, lines 35-38 discloses that a block from the reference picture that matches with the current block (from current picture) will not line

up along the boundaries into which the pictures are tiled, encoded and decoded. In other words, there are temporal artifacts caused by difference in compression ratios between two sequential pictures (ie. reference block versus current block). After decoding the series of encoded still images, Astle teaches that "selective filtering" can eradicate these artifacts in potentially artifactual areas without loss of important video data content (col.6, lines 51-60). Evidently, these block-edge artifacts are equivalent to the applicant's definition of pulsation artifacts because both are temporal artifacts caused by difference in compression ratios between two sequential pictures.

Also on page 25 of applicant's remarks, applicant states that Astle does not discuss "the individual frames are being decoded are still frames having content similar to the present application." The examiner respectfully disagrees. Clearly, the reference picture is a still frame and the current picture is another still frame, where the reference picture and the current picture are still pictures that can have "content similar" to one another. See paper no.22. Applicant contends that Astle does not discuss a still frame or series of encoded still frames. The examiner respectfully disagrees. Astle discloses the sequence of encoded video images or still frames (col.1, lines 13-16). See paper no.22. Applicant states that Astle is not even discussing an encoding process. The examiner respectfully disagrees. Note Astle's Figure 1, element 100 is an encoding system and Figure 2, element 200 is the corresponding decoding system for encoding system 100. Also, see paper no.22.

Arguments about the disclosure of the "still frame" in Reininger have already been addressed in the previous Office Actions, paper numbers 8, 13, 16, 20 and 22.

The rehashing of old, circuitous, repetitive arguments about Reininger, Astle and Pearlstein does not aid the prosecution of the case. Please reconsider the incorporation of the dependent claims 3-6, 9, 29 and 30, along with all intervening limitations, into the current independent claims because claims 3-6, 9, 29 and 30 contain patentable subject matter since none of the prior art references teach, disclose or suggest the specifics and applications of the claims' formulas, as indicated in claims 3-5 and 29-30.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, 7, 8, 10-28 and 31-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reininger (5,426,463) in view of Astle (5,751,861) in view of Pearlstein (5,568,200).

As for claim 23, Reininger discloses a system for encoding a sequence of video frames comprising:

a pre-encode processing unit (fig.2, element 25), said pre-encoding processing unit comprising:

a statistics measurement unit for use in determining prior to encoding whether a current frame of the sequence of frames comprises a still frame, said still frame comprising a frame with content substantially identical to content of a

preceding frame (fig.2, element 28 counts the number of bits that allows the determination of whether a current frame of the sequence of frames comprises a still frame or I-picture among other preceding frames such as a B-picture or P-picture; also note element 28 is inside the forward analyzer 25, and that the data obtained by the forward analyzer is used for determining proper coding iterations of each frame prior to encoding);

a control unit (fig.2, element 27; note the processor modifies at least the quantization, element 14) for modifying at least one controllable parameter (parameter being bit allocation or quantization step size) employed in non-intra encoding said still frame (ie. I-picture, B-picture or P-picture) between still frames of a sequence of still frames when said statistics measurement unit determines said current frame to comprise said still frame (col.2, ln.36-47; Reininger discloses the use of interframe processes for encoding still frames where a GOP can have various types of frames like B-pictures and P-pictures that clearly use interframe or *non-intra* coding processes to determine specific quantization parameter values for that specific still frame); and

an encoding engine (fig.2, element 15 is a encode engine that encodes said current frame of the sequence of video frames using the at least one controllable encode parameter set by the pre-encode processing unit, element 25) for encoding said current frame of the sequence of video frames using the at least one controllable encode parameter set by said pre-encode processing unit.

Although Reininger does not disclose the limitation "minimize after decoding thereof, visually perceptible pulsation artifacts between still frames of a sequence of still frames", Astle discloses the elimination of the block edge artifacts (ie. pulsation artifacts) after the decoding of a series of encoded still frames or images (col.6, lines 25-47). Astle acknowledges the existence of these "artifacts" during the decoding process of a series of encoded still frames and also provides a means to eliminate these "artifacts". Astle discloses that, more often that not, a block from the reference picture that matches with the current block will not line up along the boundaries into which pictures are tiled, encoded and decoded. In other words, when decoding image data, a still frame or a still macroblock at time t (where t is any given integer) will match, or have identical information, with a still frame or a still macroblock at time t+1. But there would be block edge artifacts or discrepancies when the still macroblock at time t match up with the still macroblock at time t+1. However, in order to eliminate these "artifacts" after decoding the series of encoded still images, Astle teaches the concept of "selective filtering" to eliminate these artifacts in potentially artifactual or problematic areas without wasting processing time and without removing important video data content (col.6, lines 51-60). Therefore, it would have been obvious to one of ordinary skill in the art to take the teachings of Reininger and Astle, as a whole, for expunging encoding/decoding distortions and errors so as to produce superior-quality images for display while maintaining at a highly efficient encoding rate.

Although Reininger and Astle do not disclose the limitation "to disable motion estimation and limit motion compensation", however, Pearlstein teaches the

disablement of motion compensation and limiting motion compensation (in col.8, lines 41-58, Pearlstein discloses that the use of a refresh control processor which utilizes a refresh descriptor data for inhibiting frame display until an appropriate amount of non-erroneous image data develops for decoding; further, in col.9, lines 6-19, Pearlstein discloses that until an appropriate amount of non-erroneous image data is constructed, the image data is refreshed meaning that previous image data is repetitiously sent until the complete reference frame is constructed, thus, stopping motion estimation and limiting motion compensation until non-erroneous image data is constructed so as to display clear, high quality image data). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Reininger, Astle and Pearlstein, as a whole, for ceasing motion estimation and limiting motion compensation so as to enable high quality display of image data at the decoding end and to encode with precision and high efficiency. Doing so would meet with today's highly complex video encoding standards.

Note claims 1, 2, 14, 19, 20, 31, 34, 35, 37, 38 and 41 have similar corresponding elements.

Regarding claims 7, 8, 24 and 25, Reininger discloses that still picture (ie. I frame), P frame or B frame types can be determined (col.6, lines 47-54; note fig.2, element 28 counts the amount of data and makes a frame-type determination from the amount of data acquired by the counter of the pre-encoding unit, element 25).

Regarding claims 10, 26 and 39, Reininger discloses that a predictive error can be determined by the "predict" section as shown in fig. 2, element 19.

Regarding claims 11-13, 15-18, 21, 22, 27, 28, 36 and 40, Reininger discloses an I frame adaptive quantization table (fig.4), a P frame adaptive quantization table (fig.6), and a B frame adaptive quantization table (fig.5) for adaptively adjust the quantizing unit's step size so that an appropriately encoding bit rate can be used depending on the type of frame that is being determined so to avoid encoding inaccuracies or "pulsation artifact." Also, Reininger discloses that the pre-encoding unit's processor in figure 2, element 27 is used for the purpose of determining an appropriate quantization level so that a proper bit rate can be employed for encoding (col.6, lines 58-67 and col.7, lines 1-27).

Allowable Subject Matter

Claims 3-6, 9, 29 and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

2. The following is a statement of reasons for the indication of allowable subject matter: none of the prior art references teach, disclose or suggest the specifics and applications of the claims' formulas, as indicated in claims 3-5 and 29-30.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen Wong whose telephone number is (703) 306-5978. The examiner can normally be reached on Mondays to Thursdays from 8am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher Kelley can be reached on (703) 305-4856. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

Allen Wong
Examiner
Art Unit 2613

AW
11/20/03